PATENT COOPERATION TREATY

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To:
GAL EHRLICH
PRTSI, INC.
P.O. BOX 16446
ARLINGTON, VA 22215

PCT

NOTIFICATION OF TRANSMITTAL OF
INTERNATIONAL PRELIMINARY
REPORT ON PATENTABILITY
(Chapter II of the Patent Cooperation Treaty)

(PCT Rule 71.1)

Date of mailing *(day/month/year)*	26 NOV 2007
Applicant's or agent's file reference 29084	**IMPORTANT NOTIFICATION**

International application No.	International filing date *(day/month/year)*	Priority date (*day/month/year*)
PCT/IL05/00559	30 May 2005 (30.05.2005)	30 May 2004 (30.05.2004)

Applicant

KORNIT DIGITAL LTD.

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary report on patentability and its annexes, if any, established on the international application.

2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communicationto all the elected Offices.

3. Where required by any of the elected Offices, the International Bureau will prepare an English translation ofthe report (but not of any annexes) and will transmit such translation to those Offices.

4. **REMINDER**

The applicant must enter the national phase before each elected Office by performingcertain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices)(Article 39(1))(see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary report on patentability. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the*PCT Applicant's Guide*.

The applicant's attention is drawn to Article 33(5), which provides that the criteria of novelty, inventive step and industrial applicability described in Article 33(2) to (4) merely serve the purposes of international preliminary examination and that "any Contracting State may apply additional or different criteria for the purposesof deciding whether, in that State, the claimed invention is patentable or not" (see also Article 27(5)). Such additional criteria may relate, for example, to exemptions from patentability, requirements for enabling disclosure, clarity and support for the claims.

Name and mailing address of the IPEA/ US Mail Stop PCT, Attn: IPEA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (571) 273-3201	Authorized officer Callie Shosho Telephone No. 571-272-1700

Form PCT/IPEA/416 (January 2004)

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 29084	**FOR FURTHER ACTION**	See Form PCT/IPEA/416
International application No. PCT/IL05/00559	International filing date *(day/month/year)* 30 May 2005 (30.05.2005)	Priority date *(day/month/year)* 30 May 2004 (30.05.2004)

International Patent Classification (IPC) or national classification and IPC

IPC: **C09D 11/02**(2006.01),**11/10**(2006.01)
USPC: 523/160;106/31.27,31.28,31.6

Applicant

KORNIT DIGITAL LTD.

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 12 sheets, including this cover sheet.
3. This report is also accompanied by ANNEXES, comprising:

   a. ☐ *(sent to the applicant and to the International Bureau)* a total of ___ sheets, as follows:

      ☐ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).

      ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.

   b. ☐ *(sent to the International Bureau only)* a total of (indicate type and number of electronic carrier(s)) _____ , containing a sequence listing and/or tables related thereto, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:

☒	Box No. I	Basis of the report
☐	Box No. II	Priority
☐	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
☐	Box No. IV	Lack of unity of invention
☒	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
☐	Box No. VI	Certain documents cited
☒	Box No. VII	Certain defects in the international application
☒	Box No. VIII	Certain observations on the international application

Date of submission of the demand	Date of completion of this report
04 April 2006 (04.04.2006)	15 November 2007 (15.11.2007)
Name and mailing address of the IPEA/ US Mail Stop PCT, Attn: IPEA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (571) 273-3201	Authorized officer Callie Shosho Telephone No. 571-272-1700

Form PCT/IPEA/409 (cover sheet)(April 2005)

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/IL05/00559

Box No. I Basis of the report

1. With regard to the **language**, this report is based on:

☒ the international application in the language in which it was filed.

☐ a translation of the international application into English, which is the language of a translation furnished for the purposes of:

☐ international search (under Rules 12.3 and 23.1(b))

☐ publication of the international application (under Rule 12.4(a))

☐ international preliminary examination (under Rules 55.2(a) and/or 55.3(a))

2. With regard to the **elements** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

☒ the international application as originally filed/furnished

☒ the description:
pages 1-43 as originally filed/furnished
pages* NONE received by this Authority on
pages* NONE received by this Authority on

☒ the claims:
pages 44-51 as originally filed/furnished
pages* NONE as amended (together with any statement) under Article 19
pages* NONE received by this Authority on
pages* NONE received by this Authority on

☐ the drawings:
pages NONE as originally filed/furnished
pages* NONE received by this Authority on
pages* NONE received by this Authority on

☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:

☐ the description, pages
☐ the claims, Nos.
☐ the drawings, sheets/figs
☐ the sequence listing (*specify*):
☐ any table(s) related to the sequence listing (*specify*):

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

☐ the description, pages
☐ the claims, Nos.
☐ the drawings, sheets/figs
☐ the sequence listing (*specify*):
☐ any table(s) related to the sequence listing (*specify*):

** If item 4 applies, some or all of those sheets may be marked "superseded."*

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/IL05/00559

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	4-5,7-9,14-15,22,25-26,29,44-56	YES
	Claims	1-3,6,10-13,16-21,23-24,27-28,30-43	NO
Inventive Step (IS)	Claims	9,44-45	YES
	Claims	1-8,10-43,46-56	NO
Industrial Applicability (IA)	Claims	1-56	YES
	Claims	NONE	NO

2. Citations and Explanations (Rule 70.7)
Please See Continuation Sheet

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY	International application No. PCT/IL05/00559

Box No. VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

Claims 10-11 and 16-56 are objected to under PCT Rule 66.2(a)(iii) as containing the following defect(s) in the form or contents thereof:

(a) Claims 10-11, 42, 44, 46, and 49-50 are objected to as being in improper form because a multiple dependent claim should refer to other claims in the alternative only.

(b) Claims 16, 18, 23, 30, 32-33, 36-37, 39, 41, and 43 are objected to as being in improper form because a multiple dependent claim cannot depend from any other multiple dependent claim.

(c) Claims 16-56 are objected to because these claims depend on claims that refer to different features, i.e. more than one feature, namely, ink, process, substrate.

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/IL05/00559

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

1. Claim 13 and 15 are objected to under PCT Rule 66.2(a)(v) as lacking clarity under PCT Article 6 because claims 13, 15, and 18-56 are indefinite for the following reason(s):

Claim 13 and claim 15 each recite that the image possesses "high" durability while claim 15 also recites "high" color definition. The scope of the claim is confusing because it is not clear what is meant by "high" or what durability or color definitions this encompasses.

Supplemental Box

In case **the space in any of the preceding boxes is not sufficient.**

Continuation of:

V. 2. Citations and Explanations:

1. Claims 3, 6, 10-13, 16-21, 23-24, 27-28, and 30-43 lack novelty under PCT Article 33(2) as being anticipated by Zou et al. (U.S. 6,140,391).

Zou et al. disclose ink possessing viscosity of 1.6-7 cP, electrical resistivity of 50-2000 ohm-cm, and sonic velocity of 1100-1700 m/s wherein the ink comprises non-aqueous ink carrier comprising alcohols, esters, ketones, and propylene glycol, 0.5-15% colorant, 0.5-30% polyol such as polyester polyol, polyether polyol, and oxidized castor oil, 0.5-30% aldehyde-based crosslinking agent such as melamine formaldehyde, catalyst that promotes reaction between the crosslinking agent, polyol, and substrate such as dinonylnaphthalene disulfonic acid, stabilizer, and surfactant. It is disclosed that the substrate contains functional groups such as carboxyl groups, hydroxyl groups, and amide groups and that the substrate includes plastics such as cellulose, nylon, polycarbonate, and acrylics. There is also disclosed process wherein ink is applied to substrate by ink jet printer followed by curing the image. Given that Zou et al. disclose ink as presently claimed, it is clear that the image formed from such ink would inherently possesses high durability, chemical fastness, and wash fastness (col.1, lines 4-8, col.3, lines 9-38, col.3, line 63-col.4, line 10, col.4, lines 41-48, col.5, lines 32-53, col.6, lines 7-20 and 25-30).

2. Claims 1, 6, 10, 12-13, and 30-40 lack novelty under PCT Article 33(2) as being anticipated by Rooney et al. (U.S. 5,349,021)

Rooney et al. disclose ink comprising 15-70% pigment, 1-15% crosslinking agent such as aldehyde-based and polyisocyanate, 0.5-6% acid catalyst such as toluenesulfonic acid, and 10-35% organic solvent such as glycols, alcohols, and glycol ethers. There is also disclosed process wherein the ink is printed onto substrate followed by curing. Given that Rooney et al. disclose ink as presently claimed, it is clear that the ink would inherently possess high durability, chemical fastness, and wash fastness (col.1, lines 6-8, col.1, line 54-col.2, line 13, col.2, line 39-col.3, line 5, col.3, lines 14-25 and 27-31, and col.10, lines 15-20).

3. Claims 1-2, 6, 10, 30-31, 33-35, and 37-40 lack novelty under PCT Article 33(2) as being anticipated by Xiao (U.S. 6,322,620).

Xiao discloses ink comprising 0.2-15% methoxymelamine crosslinking agent, 0.1-5% acid catalyst such as toluene sulfonic acid,

Supplemental Box

pigment, and solvent such as glycol ethers. There is also disclosed process wherein the ink is printed onto substrate followed by curing. Given that Xiao discloses ink as presently claimed, it is clear that the ink would inherently possess high durability, chemical fastness, and wash fastness (col.1, lines 4-6, col.2, lines 20-30, 40-49, and 54-65).

4. Claim 22 lacks an inventive step under PCT Article 33(3) as being obvious over Zou et al. (U.S. 6,140,391) in view of Thompson et al. (U.S. 6,341,856).

The disclosure with respect to Zou et al. in paragraph 1 above is incorporated here by reference.

The difference between Zou et al. and the present claimed invention is the requirement in the claim of specific substrate.

Zou et al. disclose the use of ink on substrate comprising carboxyl groups.

Thompson et al., which is drawn to inks, disclose printing the inks on substrate including those containing carboxyl groups such as cotton in order to produce images with excellent lightfastness (col.4, lines 1-9).

In light of the motivation for using specific substrate disclosed by Thompson et al., it therefore would have been obvious to one of ordinary skill in the art to use such substrate in Zou et al. in order to produce images with excellent colorfastness, and thereby arrive at the claimed invention.

5. Claim 25 lacks inventive step under PCT Article 33(3) as being obvious over Zou et al. (U.S. 6,140,391) in view of Ma et al. (U.S. 6,117,921).

The disclosure with respect to Zou et al. in paragraph 1 above is incorporated here by reference.

The difference between Zou et al. and the present claimed invention is the requirement in the claim of surface tension.

Zou et al. is silent with respect to surface tension.

Ma et al., which is drawn to ink jet inks as is Zou et al., disclose that inks suitable for ink jet process possess surface tension of 25-75 dyne/cm in order to produce ink with desired ink drop velocity, drop volume, and stream stability (col.8, lines 57-63).

In light of the above, it therefore would have been obvious to one of ordinary skill in the art to control the surface tension of the ink of Zou et al. to 25-75 dyne/cm, including surface tension as presently claimed, in order to produce ink suitable for ink jet printing, and thereby arrive at the claimed invention.

6. Claims 26 and 29 lack an inventive step under PCT Article 33(3) as being obvious over Zou et al. (U.S. 6,140,391) in view of Ma et al. (U.S. 6,117,921) and Smith et al. (U.S. 6,326,419).

The disclosure with respect to Zou et al. in paragraph 1 above is incorporated here by reference.

The difference between Zou et al. and the present claimed invention is the requirement in the claims of surface tension and particle size of the ink.

Zou et al. is silent with respect to the surface tension and particle size of the ink.

Ma et al., which is drawn to ink jet inks as is Zou et al., disclose that inks suitable for ink jet process possess surface tension of 25-75 dyne/cm in order to produce ink with desired ink drop velocity, drop volume, and stream stability (col.8, lines 57-63).

Smith et al., which is drawn to inks, disclose using ink with particle size less than 1 micron in order to avoid blocking or clogging of the printer nozzles (col.5, lines 51-56).

In light of the above, it therefore would have been obvious to one of ordinary skill in the art to control the surface tension of the ink of Zou et al. to 25-75 dyne/cm, including surface tension as presently claimed, and to use ink with particle size less than 1 micron in Zou et al. in order to produce ink suitable for ink jet printing that will not clog the printer nozzles, and thereby arrive at the claimed invention.

7. Claims 1-2, 4-5,7-8,10-11.14-18,23,30,33-34,37,43,49,50, and 55-56 lack an inventive step under PCT Article 33(3) as being obvious over Titterington et al. (U.S. 5,645,888) in view of Zou et al. (U.S. 6,140,391).

Titterington et al. disclose (i) base ink component comprising aqueous or nonaqueous ink carrier, colorant, crosslinkablility constituent, acid catalyst, plasticizer, and surfactant and (ii) curing component comprising silane crosslinking agent wherein the curing component is either aqueous or non-aqueous based. It is also disclosed that the base component can comprise the crosslinking agent while the curing component comprises the catalyst. There is further disclosed process wherein the curing component is applied to substrate followed by the base ink component (col.1, lines 9-17, col.4, lines 23-56, and col.5, lines 30-41).

The difference between Titterington et al. and the present claimed invention is the requirement in the claims of polyol.

Zou et al., which is drawn to inks, disclose the use of 0.5-30% polyol such as polyester polyol or polyether polyol in order to add flexibility to the film that forms when the ink cures in the printed substrate (col.4, line 65-col.5, line 11).

Given that Titterington et al. in combination with Zou et al. disclose ink as presently claimed, it is clear that the image formed from the ink would intrinsically possess high durability, chemical fastness, and wash fastness.

In light of the above, it therefore would have been obvious to one of ordinary skill in the art to use polyol in the ink of Titterington et al. in order to produce images with good flexibility, and thereby arrive at the claimed invention.

8. Claims 46-48 lack an inventive step under PCT Article 33(3) as being obvious over the prior art as applied in paragraph 7 above and further in view of Ma et al. (U.S. 6,117,921).

The difference between Titterington et al. in view of Zou et al. and the present claimed invention is the requirement in the claim of surface tension.

Titterington et al. is silent with respect to surface tension.

Ma et al., which is drawn to ink jet inks as is Titterington et al., disclose that inks suitable for ink jet process possess surface tension of 25-75 dyne/cm in order to produce ink with desired ink drop velocity, drop volume, and stream stability (col.8, lines 57-63).

Supplemental Box

In light of the above, it therefore would have been obvious to one of ordinary skill in the art to control the surface tension of the ink of Titterington et al. to 25-75 dyne/cm, including surface tension as presently claimed, in order to produce ink suitable for ink jet printing, and thereby arrive at the claimed invention.

9. Claims 51, 52, and 54 lack an inventive step under PCT Article 33(3) as being obvious over the prior art as applied in paragraph 7 above and further in view of Christian (U.S. 5,981,113).

The difference between Titterington et al. in view of Zou et al. and the present claimed invention is the requirement in the claim of specific wetting agent.

Titterington et al. disclose that the inks contain solvent but there is no explicit disclosure of the specific solvent utilized.

Christian et al., which is drawn to ink, disclose the use of wetting agent such as ethanol or isopropanol (col.4, lines 22-26).

In light of the above, it therefore would have been obvious to one of ordinary skill in the art to use such wetting agent in the ink of Titterington et al. in order to lower the surface tension of the ink and increase the tendency of the ink to coat the substrate, and thereby arrive at the claimed invention.

10. Claims 51-54 lack an inventive step under PCT Article 33(3) as being obvious over the prior art as applied in paragraph 7 above and further in view of Ma et al. (U.S. 6,117,921).

The difference between Titterington et al. in view of Zou et al. and the present claimed invention is the requirement in the claim of specific wetting agent.

Yang et al., which is drawn to inks, disclose the use of solvent such as hexane and heptane in order to produce a fast drying ink (col.3, lines 26-27 and 49).

In light of the above, it therefore would have been obvious to one of ordinary skill in the art to use solvent such as hexane or heptane in the ink of Titterington et al. in order to produce fast drying ink, and thereby arrive at the claimed invention.

11. Claims 9 and 44-45 meet the criteria set out in PCT Article 33(2)-(3), because the prior art, namely, Zou et al. (U.S. 6,140,391), Titterington et al. (U.S. 5,645,888), Rooney et al. (U.S. 5,349,021), and Xiao (U.S. 6,322,620) does not teach or fairly suggest process for printing an image on a substrate wherein the process comprises providing ink comprising first part comprising carrier, colorant, polyol, and agent capable of chemically interacting with the substrate and second part comprising wetting composition and catalyst or ink comprising first part comprising carrier, colorant, polyol, and catalyst and second part comprising wetting composition and agent capable of chemically interacting with substrate , contacting the substrate with second part of the ink to provide wet portion, and applying first part of the ink to the wet portion wherein the density of the second part of the ink in the wet portion ranges from about 0.01 per cm^2 to about 2 g per cm^2 as required in present claim 9 or any disclosure that the second part of the ink has surface tension lower than surface tension of first part of the ink as required in present claims 44-45.

12. Claims 1-56 meet the criteria set out in PCT Article 33(4), and thus the invention has industrial applicability because the subject matter claimed can be made or used in industry.

---------- NEW CITATIONS ----------